

Biologic Outcomes of Adherence to HIV Antiretroviral Therapy

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INNOVATIVE ADHERENCE RESEARCH PRIORITIES
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Outline

- HIV+ Urban Poor: identifying the population
- Adherence measurement
- Adherence tightly linked to HIV outcomes
 - HIV viral load suppression
 - HIV drug resistance
 - Progression to AIDS
- Adherence and treatment decisions in clinical practice

The REACH Cohort

- Target population
 - HIV+ urban poor
- HIV serotesting systematic sample (n=4682)
 - homeless shelters
 - free meal programs
 - low income single room occupancy hotels
- 330 HIV+ individuals enrolled
- Mean follow-up: 3 years

Reach Cohort Characteristics

n=330

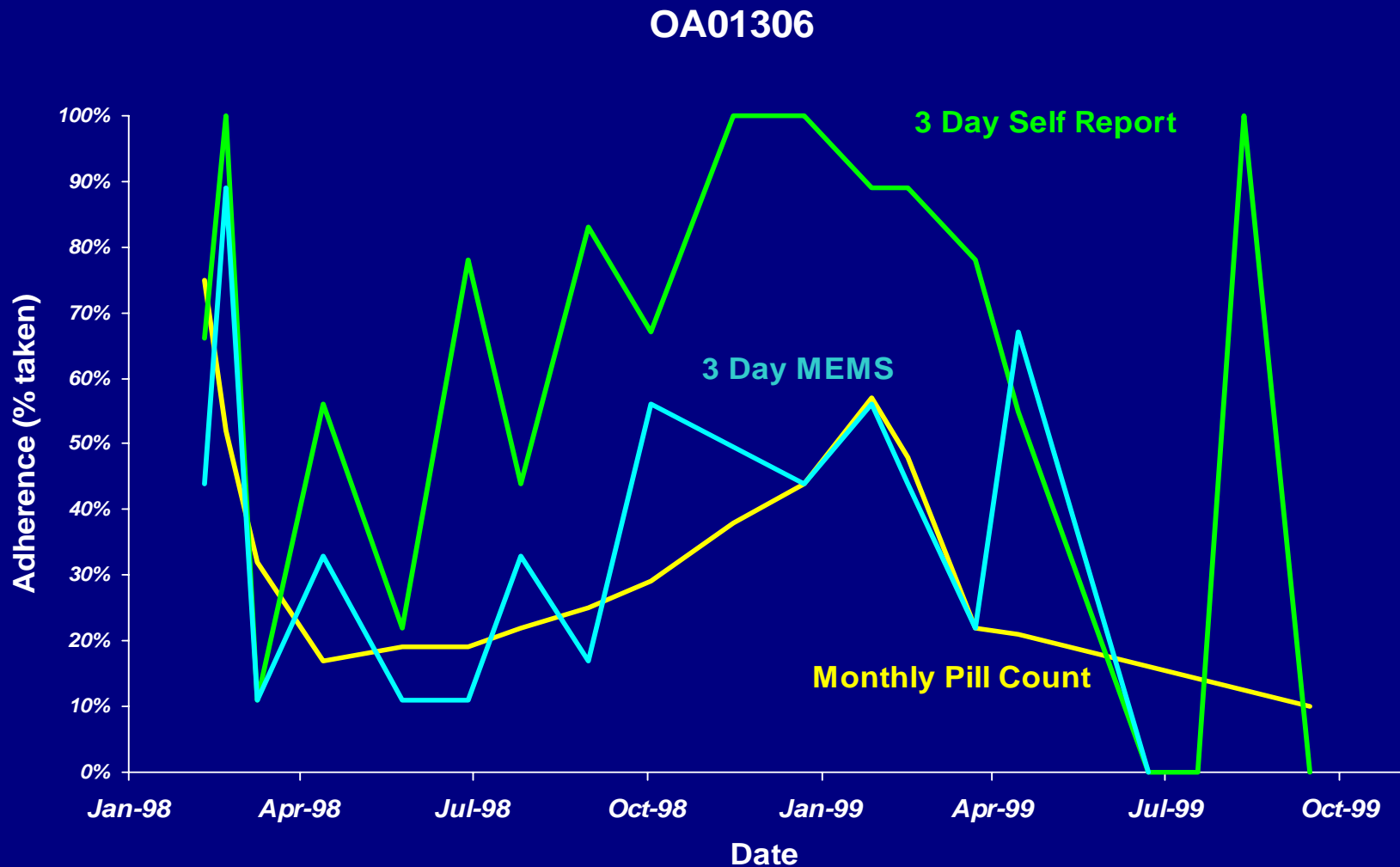
- Non-Caucasian 67%
- IDU (ever) 60%
- Psych hospitalization 25%
- Depressive symptoms (BDI>15) 45%
- Ever in prison 25%
- Housing night before enrollment
 - Street/shelter 24%
 - Hotel 70%
 - Other 6%

Adherence Measures

- Interviewer administered structured 3-day patient report
- MEMS electronic cap
- Unannounced pill count at participant's home or usual place of residence



Longitudinal Correspondence of Adherence Measures

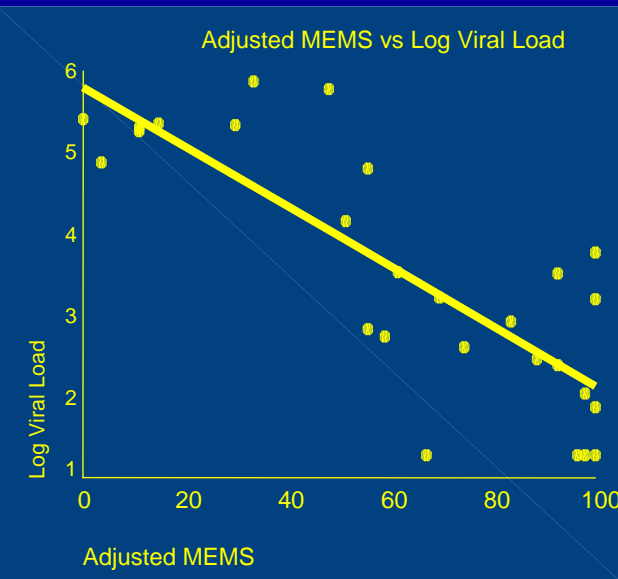


Outline

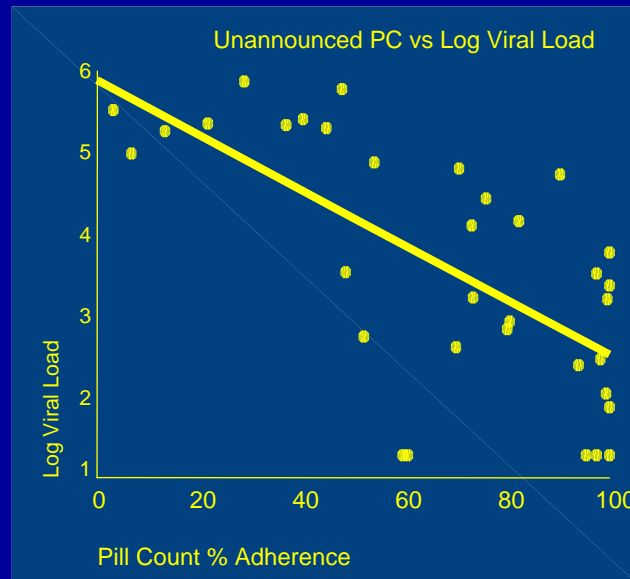
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Adherence Measures and Viral Load

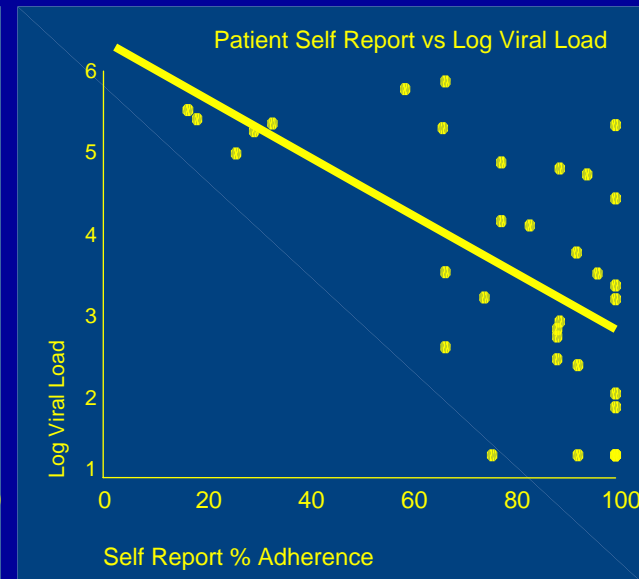
10% adherence difference : 0.33 log VL difference



MEMS
 $R^2 = 0.67$



Pill Count
 $R^2 = 0.45$



Self Report
 $R^2 = 0.36$

The Metro Section

L B1

MONDAY, NOVEMBER 18, 1991

The New York Times



TB Threat: Not Taking The Medicine

*Partly Cured Patients
Are Deadliest Carriers*

By LISA BELKIN

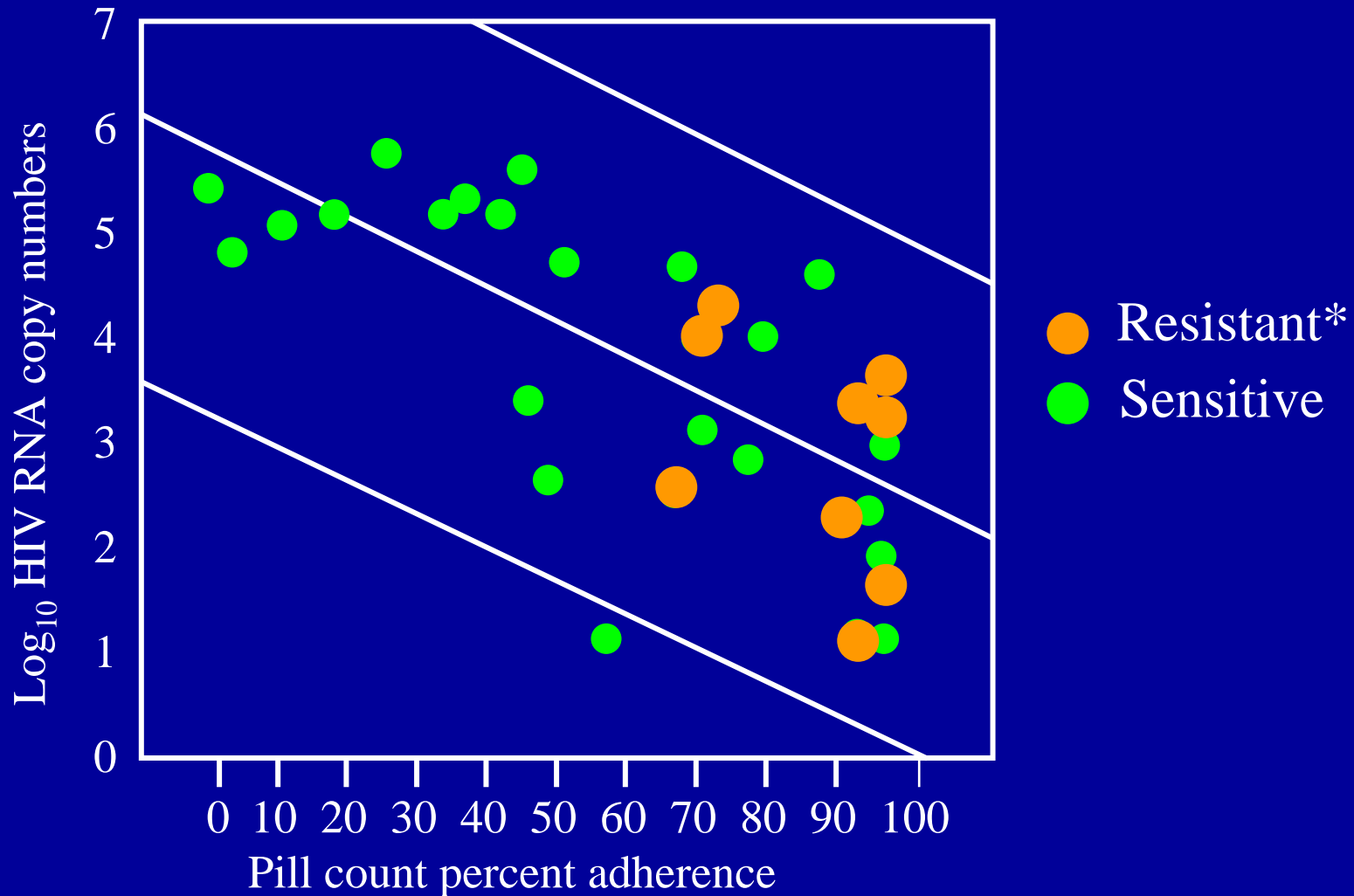
The fight against the ominous increase in tuberculosis cases in the metropolitan region comes down to one seemingly simple problem: how to get people to take their medicine.

Elsewhere in the United States doctors have experimented with bribery. In Denver, for example, they have offered free cans of beer to patients who keep their clinic appointments. Denver and other cities have also resorted to sending a social worker to every patient's house every day to watch them swallow their pills.

But those cities do not have a problem the size of New York's. There were 3,520 new cases of tuberculosis diagnosed here last year, a 38 percent increase over the 2,545 cases in 1989 and a rate for the city's

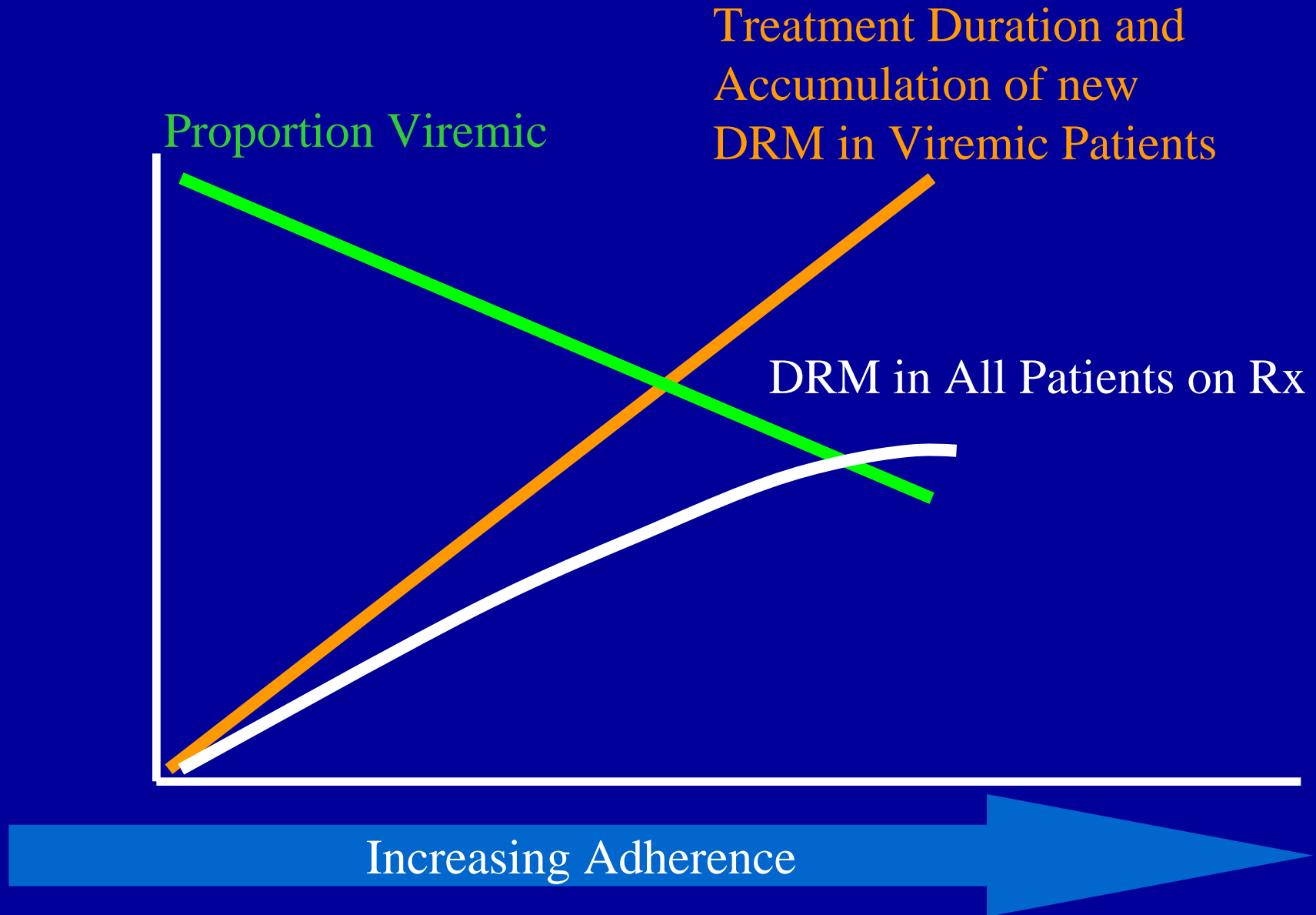
Cross-sectional Studies of Adherence and Resistance

Bangsberg D, et al. AIDS. 2000;14:357



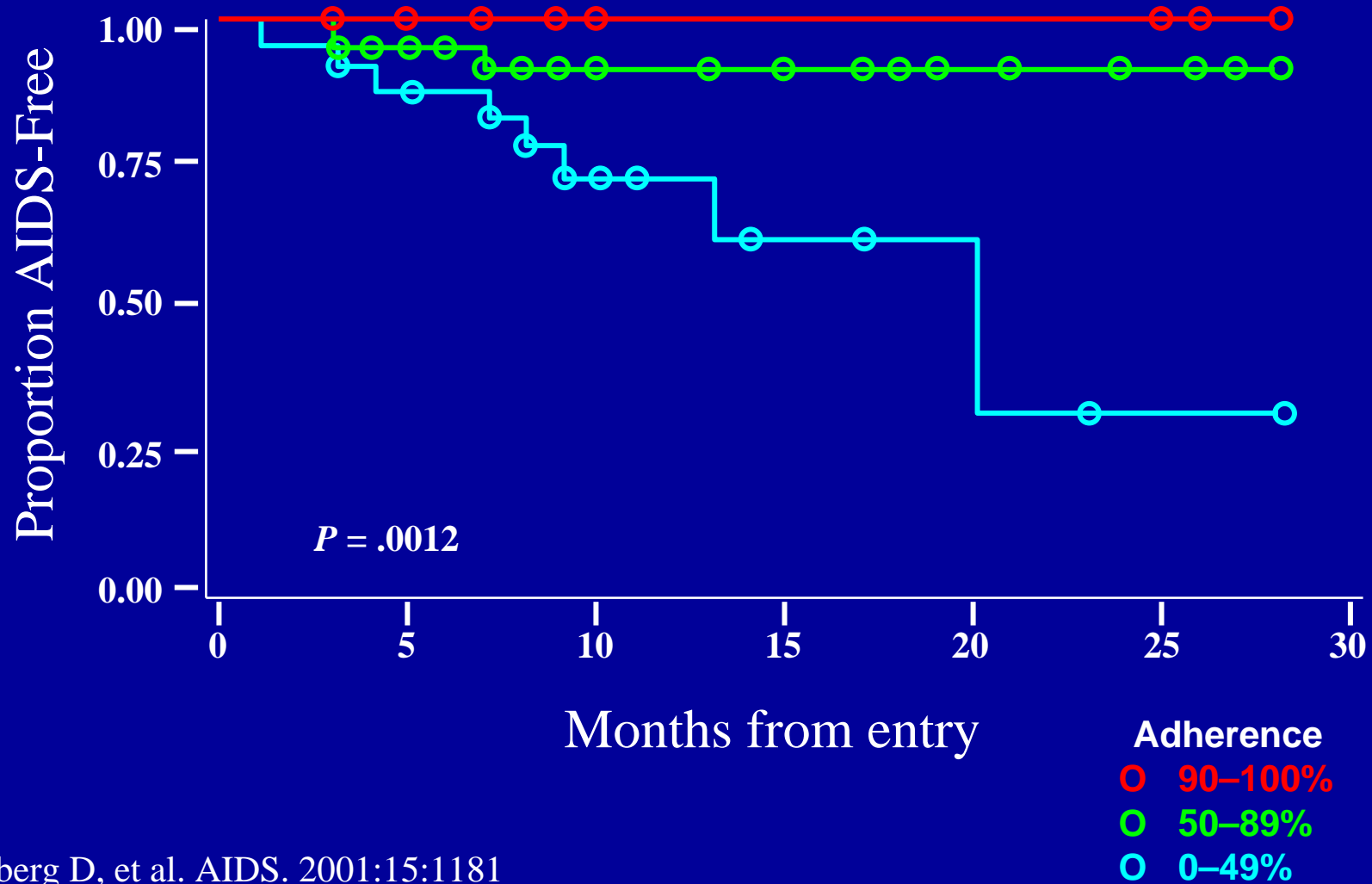
*Primary Drug Resistant Mutation IAS-USA

Adherence & Risk of Resistance Mutations

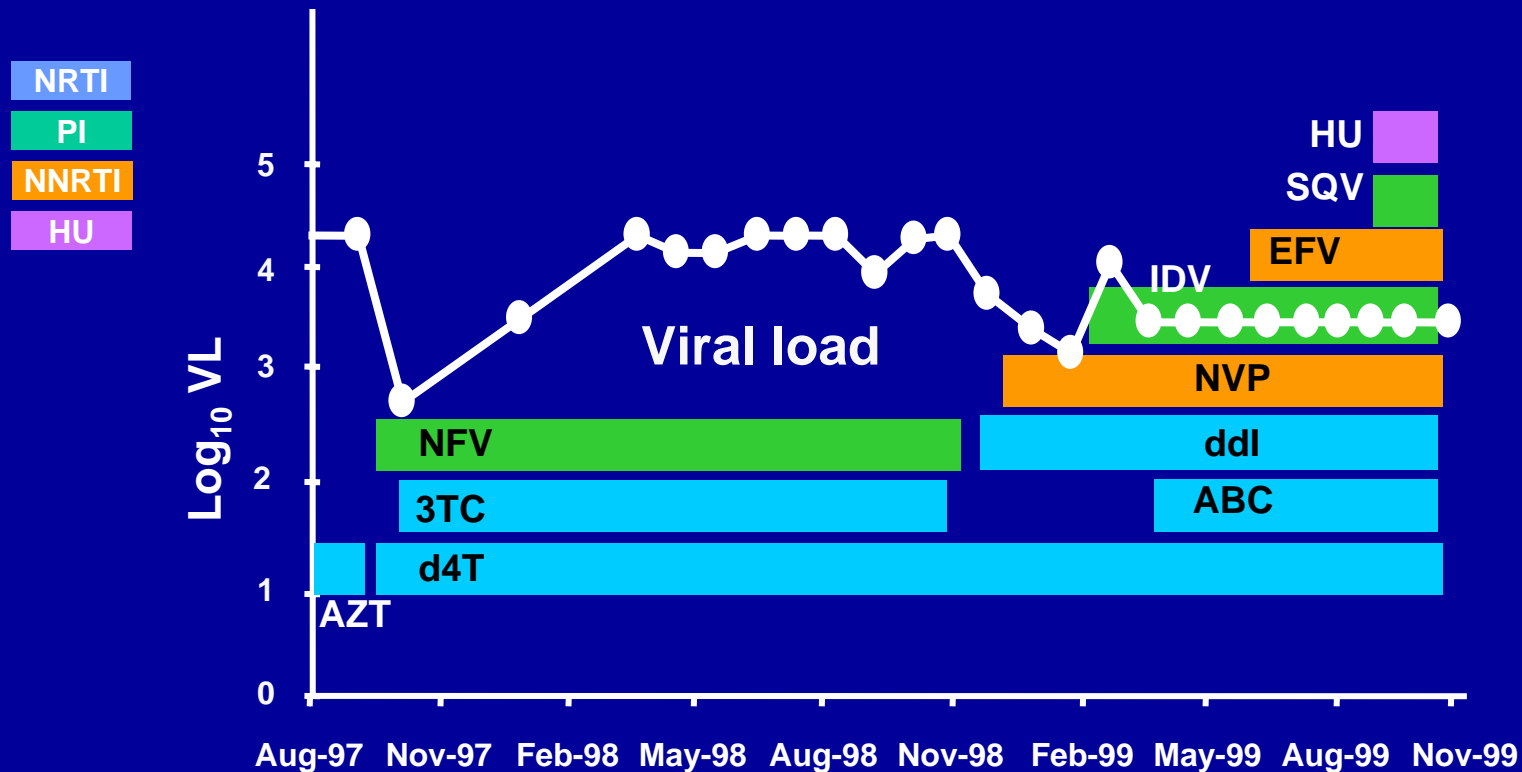


Adherence and AIDS-Free Survival

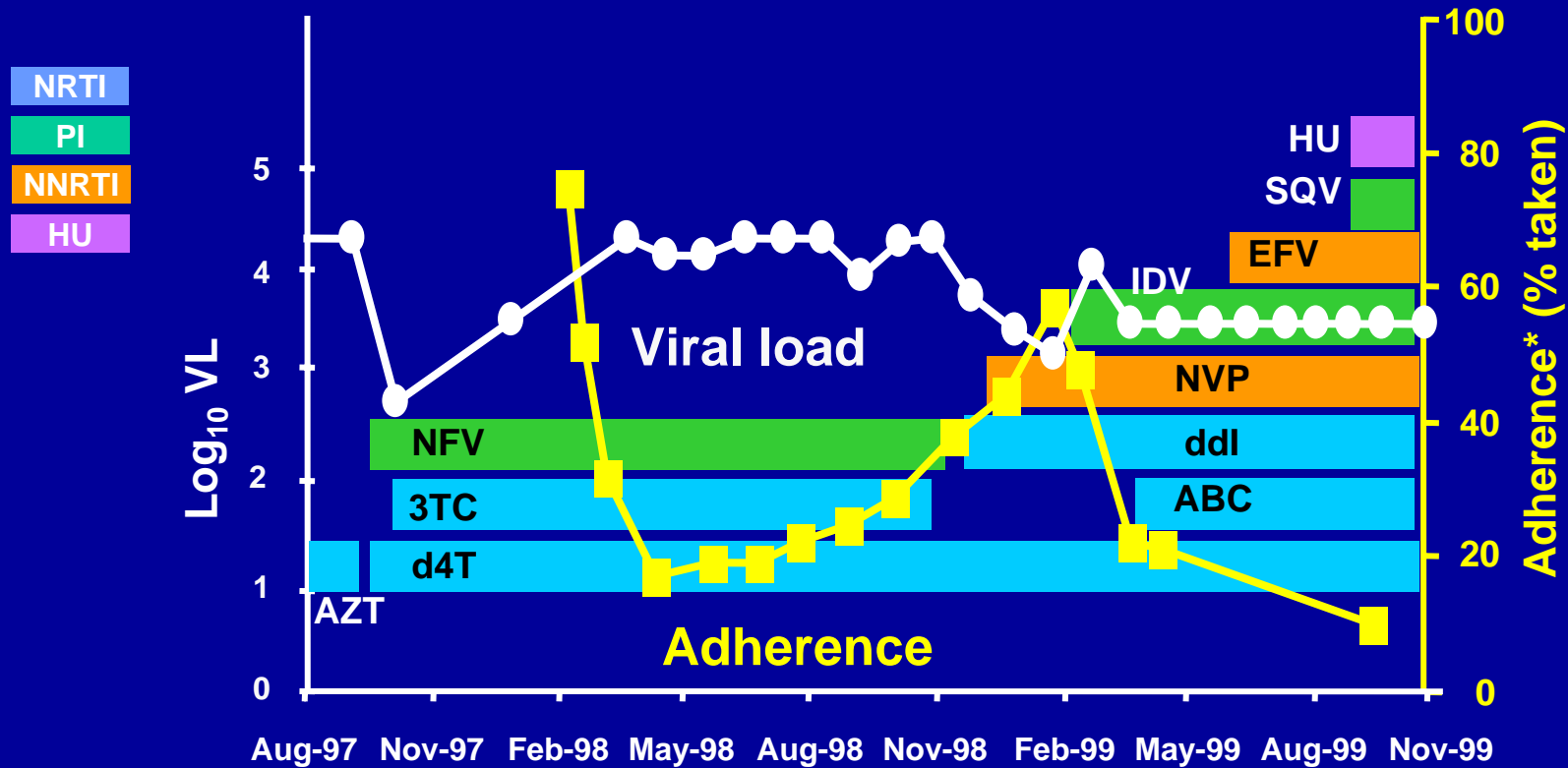
10% Adherence difference = 21% reduction in risk of AIDS



Case Study: Adherence, Viral Load, and Salvage Therapy



Case Study: Adherence, Viral Load, and Salvage Therapy

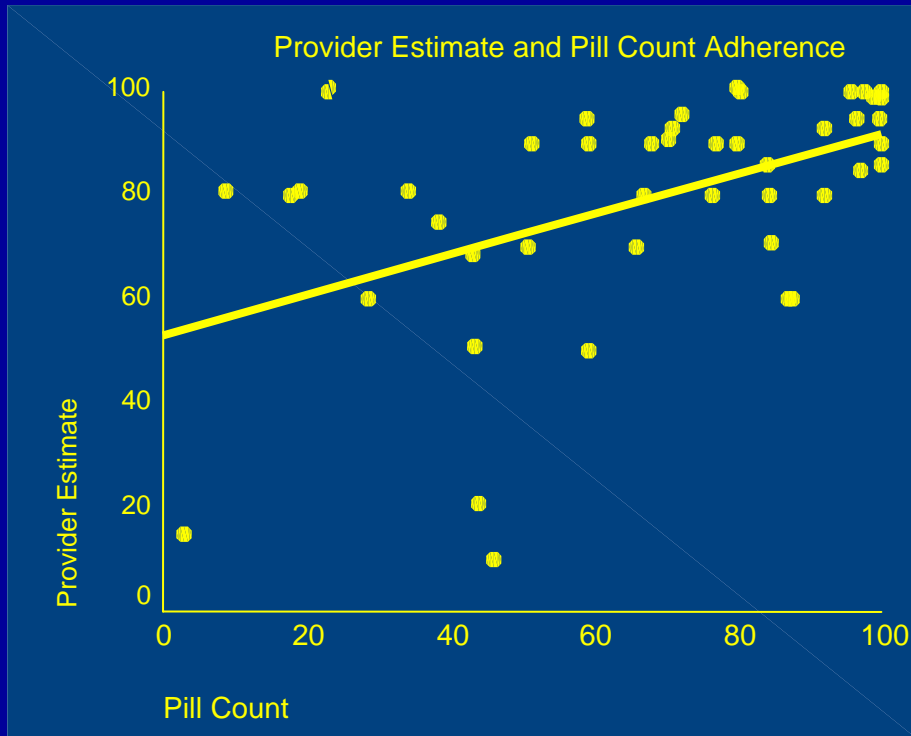


Physicians Predict Adherence Not Much Better Than Random

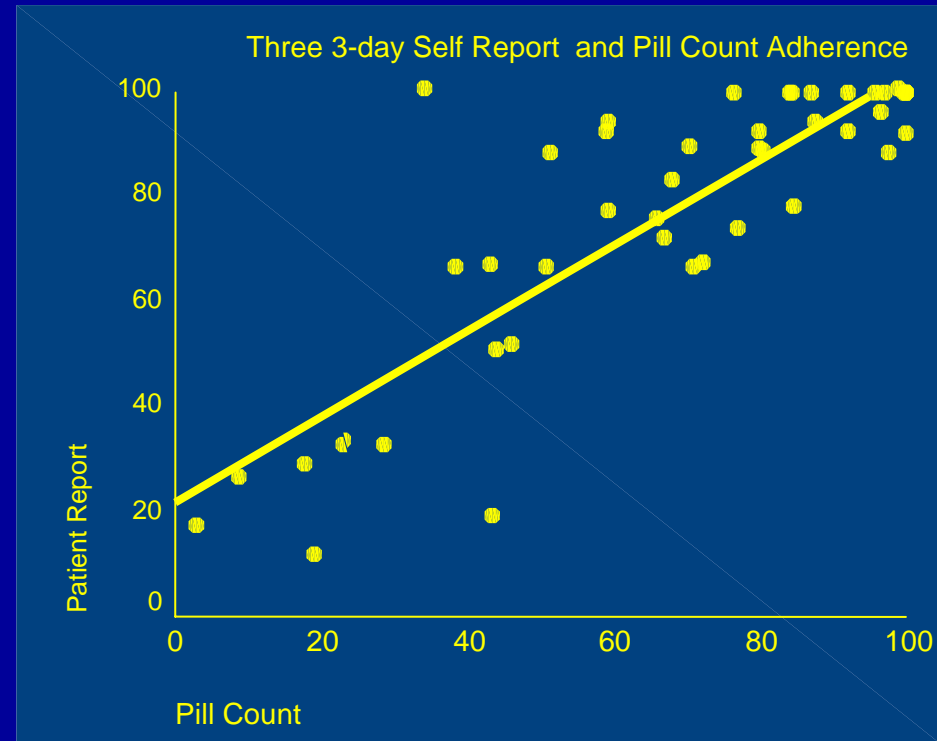
Bangsberg	2001	JAIDS	HAART
Paterson	2000	Annals Int Med	HAART
Haubrich	1999	AIDS	HAART
Steiner	1995	Arch Int Med	AZT
Bosely	1995	Eur Resp J	Inhaled terbutaline
Charney	1967	Pediatrics	Penicillin
Caron	1978	Clin Pharmacol	Anatacids
Gilbert	1980	Can Med Assoc J	Digoxin
Blowey	1997	Ped Nephrology	Cyclosporin
Mushlin	1977	Arch Int Med	Hypertensive

Provider Estimate vs. Three 3-Day Patient Report Compared to Pill Count

n=45



Provider Estimate
 $R^2 = 0.26$



Patient Report
 $R^2 = 0.72$

The Future of Adherence Assessment: Computer-Assisted Self-Interviewing (CASI)

- Purposes of CASI

- Determine patient's understanding of medication regimen
- Determine patient's adherence over 3-day period

- Advantages of CASI

- Privacy may improve disclosure
- Visual ARV recognition
- Standardizes adherence assessment
- Not personnel intensive
- Could be administered in waiting room or at home via the web
- Associated with viral load



Click on each HIV medication that you are taking.

[? Help](#)

[Back](#) ←

[Continue](#) →

☐ [Sound](#)



3TC/Epivir/
Lamivudine 150mg



400 DDI enteric/
Videx



Abacavir/
Ziagen 300mg



Agenerase/
Amprenavir



AZT/Retrovir/
Zidovudine 100mg



AZT/Retrovir/
Zidovudine 300mg



Combivir 300/
150mg



Crixivan/
Indinavir 200mg



Crixivan/
Indinavir 400mg



DDC/Hivid/
Zalcitabine 0.375mg



DDC/Hivid/
Zalcitabine 0.75mg



DDI/Didanosine/
Videx 50mg



DDI/Didanosine/
Videx 100mg



DDI/Didanosine/
Videx 150mg



DDI/Didanosine/
Videx 200mg



DDI/Didanosine/
Videx 250mg



Delavirdine/
Rescriptor 100mg



Efavirenz/
Sustiva 100mg



Efavirenz/
Sustiva 200mg



Fortovase/
Saquinavir 200mg



Kaletra/
Lopinivir



Nelfinavir/
Viracept 250mg



Nevirapine/
Viramune 200mg



Norvir/
Ritonavir 100mg



Trizivir




Zerit/
D4T/Stavudine 20mg




Zerit/
D4T/Stavudine 30mg




Zerit/
D4T/Stavudine 40mg

 Help

Back 

Continue 

 Sound

Click on any pills that you missed taking yesterday, Tuesday.

☐ Missed no meds at all yesterday, Tuesday.



3TC/Epivir/
Lamivudine 150mg



Nelfinavir/
Viracept 250mg



Zerit/
D4T/Stavudine 30mg

Morning

Missed all



Afternoon

Missed all

Evening

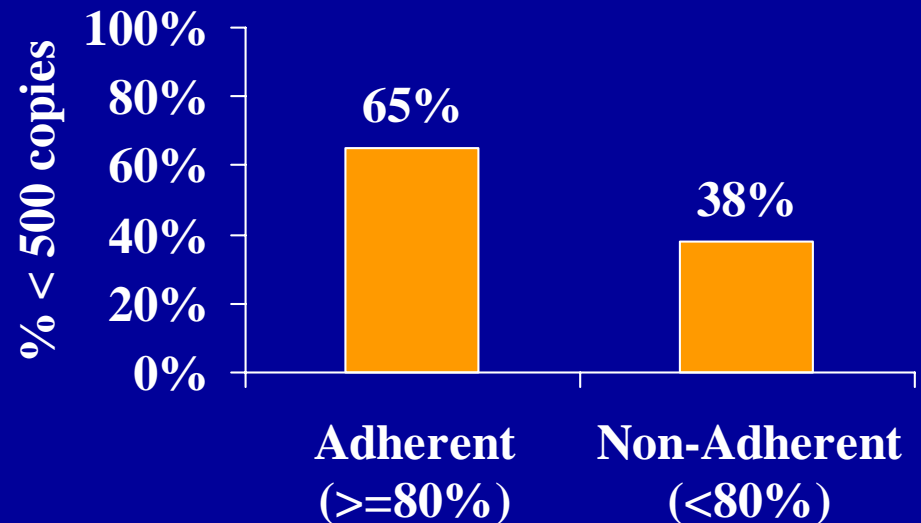
Missed all



Audio CASI Adherence Measurement

- 114 patient-provider pairs
- 18% of patients misunderstood regimen
- Providers missed 74% of non-adherent patients

**Proportion VL < 500
by Patient Reported Adherence**



Conclusions

- Rate of new drug resistant mutations increases with improving adherence in viremic patients
- Treatment duration increases with improving adherence
- This suggests that a large proportion of drug resistance occurs in highly adherent patients even when considering the higher proportion of complete viral suppression.
- This *does not* suggest that incomplete adherence should be advocated as a strategy to prevent drug resistance

Investigators

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